this temperature oscillation may exist even when the discontinuity is not pronounced. The attempts to measure the ordinary seiche in Loch Garry were not very successful, the seiches being irregular and difficult to measure. The periods indicated were 10·5–11·1 minutes for the uninodal and about 5·5 minutes for the binodal.—The discharge of water from circular weirs and orifices: G. H. **Gulliver.** The elliptic integral which gives the discharge was computed graphically, and the results compared with experiment. Curves were drawn showing the relation between the discharge and the head. The observational and theoretical curves were of the same form, and were practically straight for heads between the centre and top of the circular aperture. This suggests that a circular weir, if kept more than half full yet not completely drowned, might be usefully employed in gauging streams. With the orifice of 2½ inches diameter used in the experiments, the discharge in gallons per minute was given by the formula 11H−0·8, where H is the head in inches above the lowest point of the orifice.—Dissymmetrical separations in the Zeeman effect in tungsten and molybdenum: Dr. Robert **Jack.** The relative intensities of the components of a Zeeman triplet depend upon polarisation effects of the grating in relation to the polarised state of the light. The experiments showed that concurrently with the change in the intensities of triplets for different parts of the spectrum there is a change in the type of dissymmetry. As the middle component passes through its minimum value there is a change from the normal dissymmetry (middle component nearer the red side component) to the abnormal dissymmetry (middle component nearer the violet side component). The dissymmetry could not be entirely accounted for by the angular position between the lines of the grating and the planes of vibration of the components. Voigt's theory based on the presence of couplings between electrons of different vibration period seemed to explain the phenomena sufficiently.—A question in absorption spectroscopy: Dr. R. A. **Houstoun** and A. S. **Russell.** The question is as to the effect of mixing two coloured solutions upon the absorption spectrum of each. Observations by Melde, Bostwick, Krüss, and Formánek seemed to indicate a shift of the absorption bands; but Schuster pointed out that a shift of this nature would be observed if, instead of mixing, the one solution was placed behind the other. Any other change indicated by theory would be too small to be appreciable. The experiments described in this paper were made by a differential method, so that the effect with the solutions in line, but not mixed, could be immediately compared with the effect when they were mixed. The conclusion come to was that there is no evidence for the existence of an effect of the kind described by the experimenters named above.

PARIS.

Academy of Sciences, November 2.—M. Emile Picard in the chair.—Spectroscopic researches on the Morehouse comet, 1908*c*: H. **Deslandres** and A. **Bernard.** The observations were commenced on October 14, ten days after those of La Baume-Pluvinel. Owing to the abnormal proportion of the blue to the ultra-violet rays, this comet, which was by eye observations of the sixth magnitude, appeared photographically of a higher magnitude. No trace of the hydrocarbon bands usual with comets could be detected; a continuous spectrum appeared on all the plates from October 14 onwards, but its intensity is relatively less than in the Daniel comet of last year. A table is given showing the wave-lengths and intensities of the principal condensations of the nucleus. Two ultra-violet bands of the cyanogen group are present, together with some lines of unknown origin, previously observed in Daniel's comet.—The pumice of the volcanic *massif* of Mont-Dore: A. **Lacroix.**—The value of the invariant ρ for a class of algebraic surfaces: L. **Remy.**—The influence of pressure on the ionisation produced in gases by the X-rays. The saturation current: E. **Rothé.** A study of the influence of pressure on ionisation phenomena in general. From pressures of 0·1 to 0·5 atmosphere the intensity of the saturation current is proportional to the pressure. The precautions found necessary for the regular working of the Crookes's tube are detailed.—Compensation electrometers and electroscopes: M. **Hurmuzescu.** The apparatus described, and of which a diagram is given, is capable of measuring potentials down to 0·01 volt.—An apparatus for receiving radio-telegraphic time signals on board ship: C. **Tissot** and Félix **Pellin.** A thermoelectric detector is employed, capable of responding to waves of one determined wave-length only.—A new determination of the mechanical equivalent of heat: V. **Crémieu** and L. **Rispail.** The heat produced was measured at constant temperature in a Bunsen ice calorimeter, the recent determinations of M. Leduc on the densities of the ice and water being used. The mean value obtained for J was $4{\cdot}1851\times10^7$ ergs, with an experimental error of less than 1/1500.—The separation of tungstic acid and silica: Paul **Nicolardot.** The method is based on the volatilisation of the tungsten by heating the mixture of tungstic acid and silica to 440° C. in a current of partially dried air and chloroform vapour.—The determination of the atomic weight of the simple ponderable substance, pantogen: G. D. **Hinrichs.** A fundamental material, pantogen, of atomic weight 1/128, or 0·007813, is assumed, and a theory developed of the weight and geometrical form of the atoms of hydrogen, helium, nitrogen, oxygen, and fluorine.—The phosphides of zinc: Pierre **Jolibois.** Zinc and red phosphorus were heated to a red heat in a crucible until phosphorus vapours ceased to be evolved. The resulting phosphide was separated from the excess of zinc by three methods:—the volatilisation of the zinc in a vacuum at 600° C., the solution of the zinc in mercury, and the action of fuming nitric acid. The same phosphide is left by all three methods of separation, and its composition corresponds to the formula Zn_3P_2. This phosphide with dilute hydrochloric acid gives a very pure phosphoretted hydrogen. The preparation and properties of ZnP_2 are also described.—The hydrolysis of perchloride of iron; the influence of neutral salts: G. **Malfitano** and L. **Michel.** Solutions of ferric chloride to which potassium chloride has been added present the phenomena of the colloidal state more rapidly and to a greater degree than solutions of pure ferric chloride. Other chlorides (sodium, barium, ammonium, magnesium) behave in a similar manner.—Aloesol, a complex phenol prepared with the aid of certain aloes: E. **Léger.** The tetrachloro-derivative of a new phenol is obtained by the action of hydrochloric acid and potassium chlorate on Cape aloes.—The fixation of different derivatives of the same colouring matter, and an explanation of dyeing: L. **Pelet-Jolivet** and N. **Andersen.** The experiments cited confirm the theory of dyeing of Freundlich and Loser.—Glycocholic acid: Maurice **Piettre.** The method described is capable of giving a yield of 60 per cent. to 75 per cent. of the bile as glycocholic acid, and the product is not contaminated with taurocholic acid, an advantage over the usual methods of separation. The chemical and physical properties of the purified acid are given, together with the results of some experiments on the toxic power of sodium glycocholate.—The colloidal properties of starch and the unity of its constitution: Eugène **Fouard.**—The oïdium of the oak: Paul **Hariot.** This disease of the oak has become widely distributed in France during the last year, and the dry north-east winds appear to have contributed to the spreading. All the native trees may be attacked, but the American oak appears to be immune.—The discovery of coal in Madagascar by Captain Colcanap: Marcellin **Boule.** Layers of coal, of a thickness of 0·3 to 0·5 metre, have been discovered in the neighbourhood of Bénénitra.—Report of the wireless telegraphy committee of the Academy of Sciences: Bouquet **de la Grye.**

DIARY OF SOCIETIES.

THURSDAY, NOVEMBER 12.

ROYAL SOCIETY, at 4.30.—The Charges on Ions in Gases, and the Effect of Water Vapour on the Motion of Negative Ions: Prof. J. S. Townsend, F.R.S.—The Charges on Ions produced by Radium: C. E. Haselfoot.—The Occlusion of the Residual Gas and the Fluorescence of the Glass Walls of Crookes's Tubes: A. A. Campbell Swinton.—An Investigation on the Anatomical Structure and Relationships of the Labyrinth in the Reptile, the Bird and the Mammal: Dr. A. A. Gray.—The Natural Mechanism for Evoking the Chemical Secretion of the Stomach (Preliminary Communication): Dr. J. S. Edkins and Miss M. Tweedy.—Further

Observations on Welwitschia: Prof. H. H. W. Pearson.—On the Presence of Hæmo agglutinins, Hæmo-opsonins and Hæmo-ly-ins in the Blood obtained from Infectious and Non-Infectious Diseases in Man (Preliminary Report): L. S. Dudgeon.—Preliminary Note on the Occurrence of a New Variety of Trypanosomiasis on the Island of Zanzibar: A. Edington.

MATHEMATICAL SOCIETY, at 5.30 (*Annual General Meeting*).—On the Theory of Groups of Finite Order (Presidential Address): Prof. W. Burnside.—On the Dirichlet Series and Asymptotic Expansion of Integral Functions of Zero Order: J. E. Littlewood.—The Norm Curves on a Given Base: Prof. F. Morley.—Satellite Curves on a Plane Cubic: J. O'Sullivan.—On the Arithmetical Nature of the Coefficients in a Group of Linear Substitutions (Third Paper): Prof. W. Burnside.—On the Second Mean Value Theorem of Integral Calculus: Dr. E. W. Hobson.—On the Representation of a Function by Means of a Series of Legendre's Functions: Dr. E. W. Hobson.—The Conformal Transformations of a Space of Four Dimensions and their Applications to Geometrical Optics: H. Bateman.—Periodic Properties of Partitions: D. M. Y. Sommerville.—The Solution of Integral Equations: Prof. A. C. Dixon.—The Eliminant of Three Quantics in Two Independent Variables: A. L. Dixon.—A Note on the Continuity or Discontinuity of a Function defined by an Infinite Product: G. H. Hardy.—The Energy and Momentum of an Ellipsoidal Electron: F. B. Pidduck. On q-Integration: Rev. F. H. Jackson.—On q-Transformations of Power Series: Rev. F. H. Jackson.—The Complete Solution in Integers of the Eulerian Equation $X^4 + Y^4 = U^4 + V^4$: Dr. T. Stuart.—An Asymptotic Formula for the Generalised Hypergeometric Series: T. J. I'A. Bromwich.

FRIDAY, NOVEMBER 13.

PHYSICAL SOCIETY, at 8.

MALACOLOGICAL SOCIETY, at 8.—Note on *Diplommatina strubelli*, Smith: E. A. Smith.—The Radulæ of British Helicids, Part ii: Rev. E. W. Bowell.—New Marine Mollusca from New Caledonia, &c.: G. B. Sowerby.—New Species of Macrochlamys and Monocondylæa from Siam: H. B. Preston.—A New Species of Oliva: F. G. Bridgman.

ROYAL ANTHROPOLOGICAL INSTITUTE, at 8.30.—Huxley Memorial Lecture: The European Population of the United States: Prof. W. Z. Ripley.

ROYAL ASTRONOMICAL SOCIETY, at 5.—The Short-Period Variable W Ursæ Majoris: J. M. Baldwin.—On the Inclination of the Planes of some Spiral Nebulæ to the Galaxy: H. Knox Shaw.—Observations of Jupiter during the Apparition of 1907-8: Rev. T. E. R. Phillips.—Calendar Dates in the Aramaic Papyri from Assuan: J. K. Fotheringham.—On the Photographs of Comet 1908 *c* Morehouse: E. E. Barnard.—Observations of Minor Planets from Photographs taken with the 30-inch Reflector, 1907: Royal Observatory, Greenwich.—The Total Solar Eclipse of 1911, April 28: A. M. W. Downing.—The Comet of 1556; its Possible Breaking-up by an Unknown Planet into Three Parts, seen in 1843, 1880, and 1882: Prof. George Forbes.—On the Old Observations of Jupiter's Satellites: Prof. R. A. Sampson.—An Improved Telescope Triple Object Glass: J. W. Gifford.—Real Paths of Brilliant Meteors Observed in 1908: W. F. Denning.—(1) Photographs of Comet *c* 1908; (2) Note on the Telegraphic Determination of the Longitude Greenwich-Ascension-Cape, in the Year 1908; (3) Note on the Appearance of Saturn's Rings, 1908 October: Royal Observatory, Greenwich.—Note on the Regnal Years in the Aramaic Papyri from Assuan: E. B. Knobel.—(1) Historical Data for the Secular Acceleration of the Moon: (2) Oppolzer's and Ginzel's Corrections to Hansen: J. K. Fotheringham.—*Probable Papers:* On the Absorption of Light in its Passage through Interstellar Space: (2) Note on the Number of Faint Stars with Large Proper Motions: Prof. H. H. Turner.—The Flagstaff Photographs of Mars in 1907: E. M. Antoniadi.—Illustrations of Recent Work on Solar Vortices: Prof. G. E. Hale.

MONDAY, NOVEMBER 16.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Some Aspects of the River Paraná, and its Watershed: an Economic Survey: W. S. Barclay.

TUESDAY, NOVEMBER 17.

ZOOLOGICAL SOCIETY, at 8.30.

ROYAL STATISTICAL SOCIETY, at 5.

MINERALOGICAL SOCIETY, at 8.—On a New Method for Studying the Optical Properties of Crystals: the late Dr. H. C. Sorby, F.R.S.—Note on the Spontaneous Crystallisation of Drops of Solutions in Spherulites: M. Jacques Chevalier.—On the Composition of the Chandakapur Meteoric Stone: H. E. Clarke and H. L. Bowman.—On Micas from North Wales and Connemara: Dr. A. Hutchinson and W. Campbell Smith.—On the Occurrence of a Rare Mineral, Carminite in Cornwall: Arthur Russell.—On Russian Universal Instruments and Methods: T. V. Barker.

INSTITUTION OF CIVIL ENGINEERS, at 8.—*Further Discussion:* Glasgow Central Station Extension: D. A. Matheson.

WEDNESDAY, NOVEMBER 18.

ROYAL SOCIETY OF ARTS, at 8.—Inaugural Address by Sir William White, K.C.B., F.R.S.

GEOLOGICAL SOCIETY, at 8.—The Geological Interpretation of the Earth-Movements Associated with the Californian Earthquake of April 18, 1906: R. D. Oldham.—On some Intrusive Rocks in the Neighbourhood of Eskdale, Cumberland: A. R. Dwerryhouse.

ENTOMOLOGICAL SOCIETY, at 8.

ROYAL MICROSCOPICAL SOCIETY, at 8.—The Present Status of Micrometry: Dr. Marshall D. Ewell.—Note on a New Growing Cell for Critical Observation under the Highest Powers: A. A. C. E. Merlin.—Studeria, a Remarkable New Genus of Alcyonarians: Prof. J. A. Thomson.

ROYAL METEOROLOGICAL SOCIETY, at 7.30.—Twenty-fifth Anniversary of the German Meteorological Society held at Hamburg, September 28–30, 1908: Henry Harries.—Investigation of the Electrical State of the Upper Atmosphere made at the Howard Estate Observatory, Glossop: W. Makower, Margaret White and E. Marsden.—Balloon Observations made at Birdhill, Co. Limerick, during July and August, 1908: Capt. C. H. Ley.

THURSDAY, NOVEMBER 19.

ROYAL SOCIETY, at 4.30.—*Probable Papers.*—Memoir on the Theory of the Partitions of Numbers. Part IV.: On the Probability that the Successful Candidate at an Election by Ballot may Never at any Time have Fewer Votes than the One who is Unsuccessful; on a Generalisation of this Question; and on its Connection with other Questions of Partition, Permutation, and Combination: Major P. A. MacMahon, F.R.S.—The Propagation of Groups of Waves in Dispersive Media, with Application to Waves on Water produced by a Travelling Disturbance: T. H. Havelock.—On the Refraction and Dispersion of Krypton and Xenon and their Relation to those of Helium and Argon: C. Cuthbertson and M. Cuthbertson.—Note on Horizontal Receivers and Transmitters in Wireless Telegraphy: Prof. H. M. Macdonald, F.R.S.—On Optical Dispersion Formulæ: R. C. Maclaurin.—(1) On the Accumulation of Helium in Geological Time: (2) On Helium in Saline Minerals and its Probable Connection with Potassium: Hon. R. J. Strutt, F.R.S.—Note on the Effect of Hydrogen on the Discharge of Negative Electricity from Hot Platinum: Prof. H. A. Wilson, F.R.S.—On Measurement of Rotatory Dispersive Power in the Visible and Ultra-violet Regions of the Spectrum: Dr. T. Martin Lowry.

CHEMICAL SOCIETY, at 8.30.

LINNEAN SOCIETY, at 8.—On a New Species, Symphyla, from the Himalayas: Prof. A. D. Imms.—The Freshwater Crustacea of Tasmania, with Remarks on their Geographical Distribution: Geoffrey Smith.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Inaugural Address by the President: Mr. W. M. Mordey.

FRIDAY, NOVEMBER 20.

INSTITUTION OF MECHANICAL ENGINEERS, at 8.—The Resistance of Materials to Impact: Dr. T. E. Stanton and L. Bairstow.—Different Methods of Impact Testing on Notched Bars: F. W. Harbord.

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